23cm Band post WRC-23

2024 International EME Conference

Trenton, NJ 2024

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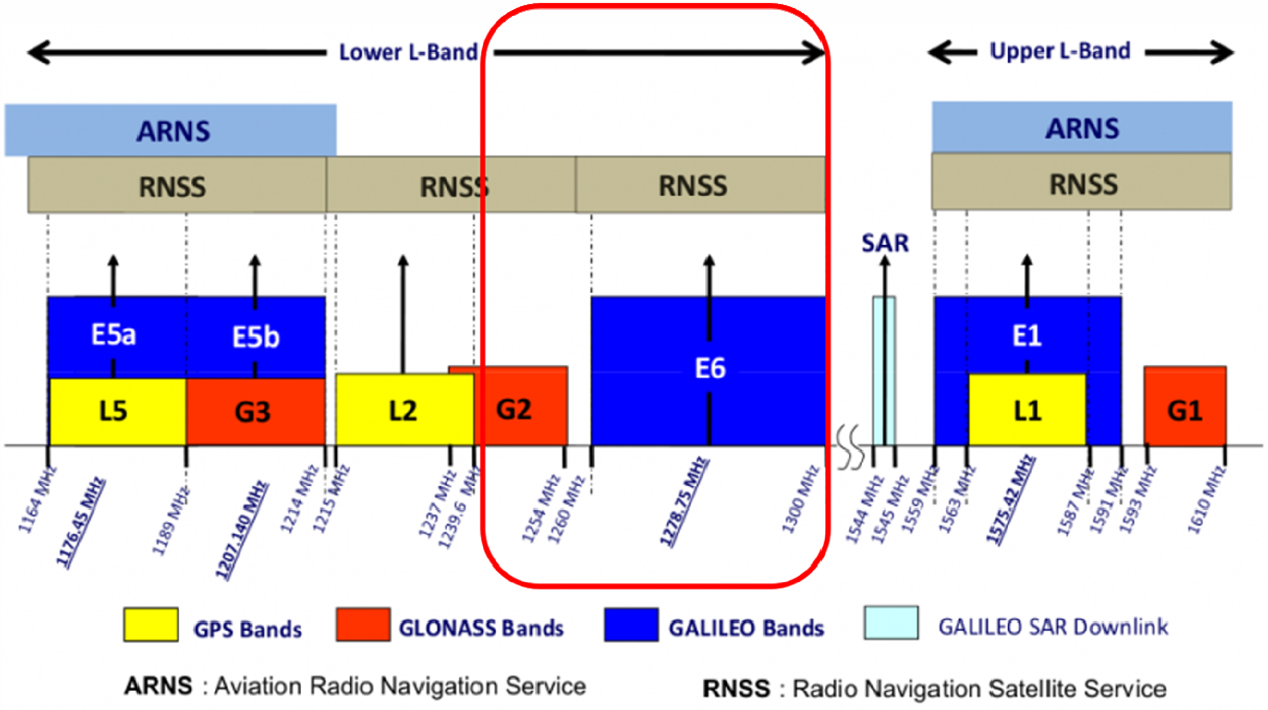
International Amateur Radio Union - Working for the future of amateur radio

Protecting the Primary RNSS

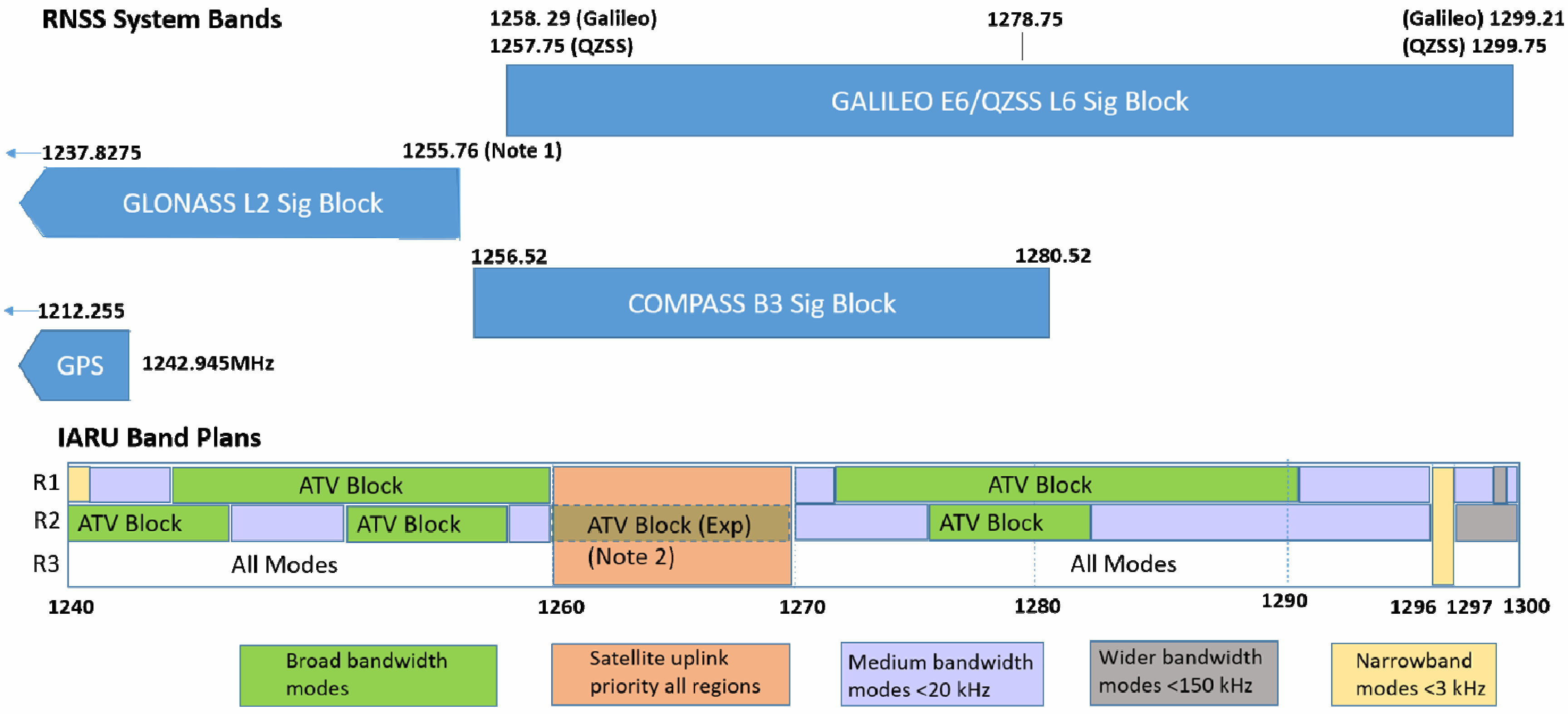
- A reminder of the issue.
- Summarising the ITU-R activities and deliverables.
- The WRC23 Agenda Item 9.1 Topic b) outcome.
- Summarising the proposed technical measures.
- Next steps in the European Region.
- Impact on EME 23cm band operations.

Protecting the Primary RNSS



- To consider technical and operational measures to protect primary RNSS services from secondary amateur services.

The various RNSS systems across 23cm



RNSS System Bands

1258. 29 (Galileo)
1257.75 (QZSS)

1278.75

(Galileo) 1299.21
(QZSS) 1299.75

GALILEO E6/QZSS L6 Sig Block

1237.8275

1255.76 (Note 1)

GLONASS L2 Sig Block

1256.52

1280.52

COMPASS B3 Sig Block

1212.255

GPS

1242.945MHz

IARU Band Plans

R1 ATV Block ATV Block

R2 ATV Block ATV Block ATV Block (Exp) ATV Block

R3 All Modes (Note 2) All Modes

1240 1260 1270 1280 1290 1296 1297 1300

🟩 Broad bandwidth modes

🟧 Satellite uplink priority all regions

🟪 Medium bandwidth modes <20 kHz

⬜ Wider bandwidth modes <150 kHz

🟨 Narrowband modes <3 kHz

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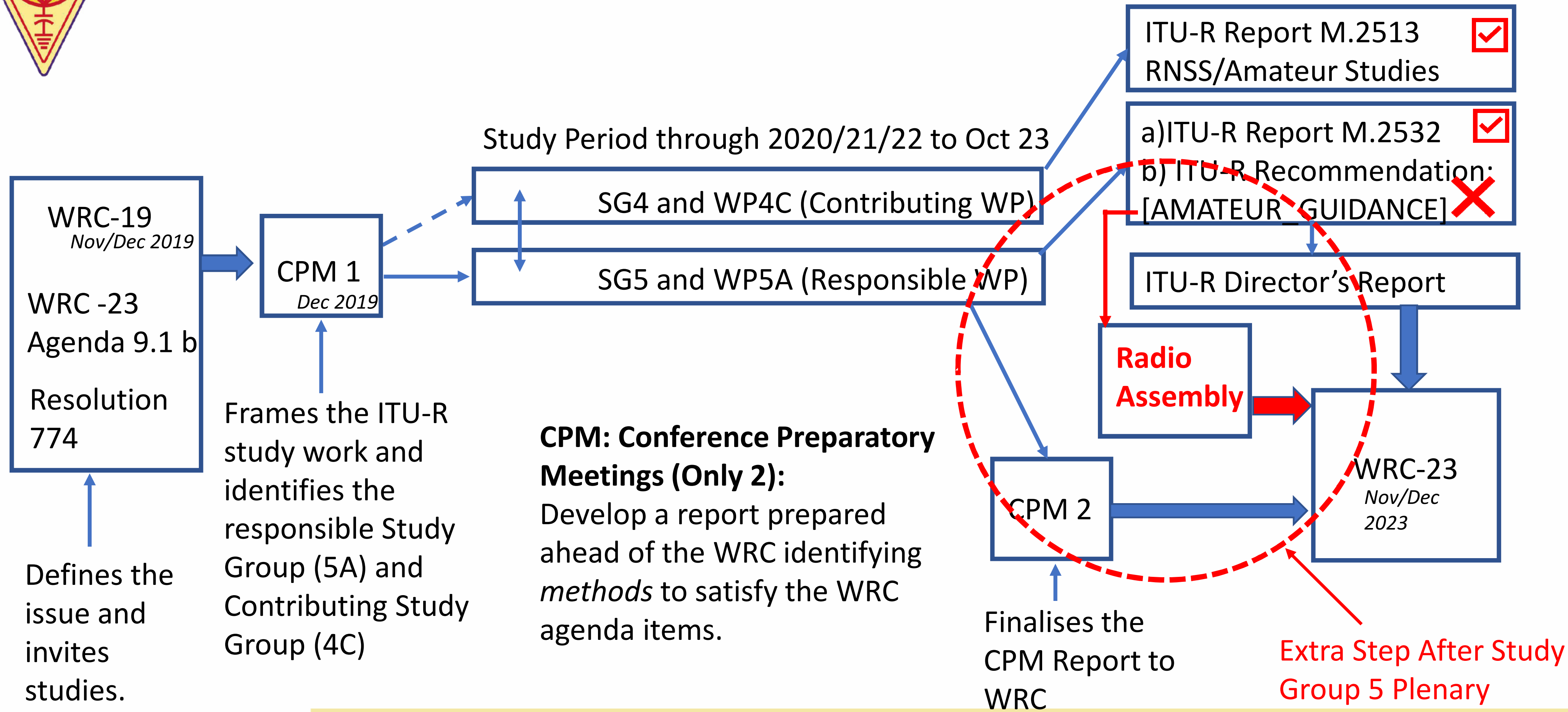
ITU-R Study Period (WRC19 to WRC23)



WRC-19
Nov/Dec 2019

WRC -23
Agenda 9.1 b

Resolution 774

Defines the issue and invites studies.

CPM 1
Dec 2019

Frames the ITU-R study work and identifies the responsible Study Group (5A) and Contributing Study Group (4C)

Study Period through 2020/21/22 to Oct 23

SG4 and WP4C (Contributing WP)

SG5 and WP5A (Responsible WP)

CPM: Conference Preparatory Meetings (Only 2):
Develop a report prepared ahead of the WRC identifying *methods* to satisfy the WRC agenda items.

ITU-R Report M.2513 ☑
RNSS/Amateur Studies

a)ITU-R Report M.2532 ☑
b) ITU-R Recommendation: [AMATEUR_GUIDANCE] ☒

ITU-R Director's Report

Radio Assembly

CPM 2

Finalises the CPM Report to WRC

WRC-23
Nov/Dec 2023

Extra Step After Study Group 5 Plenary

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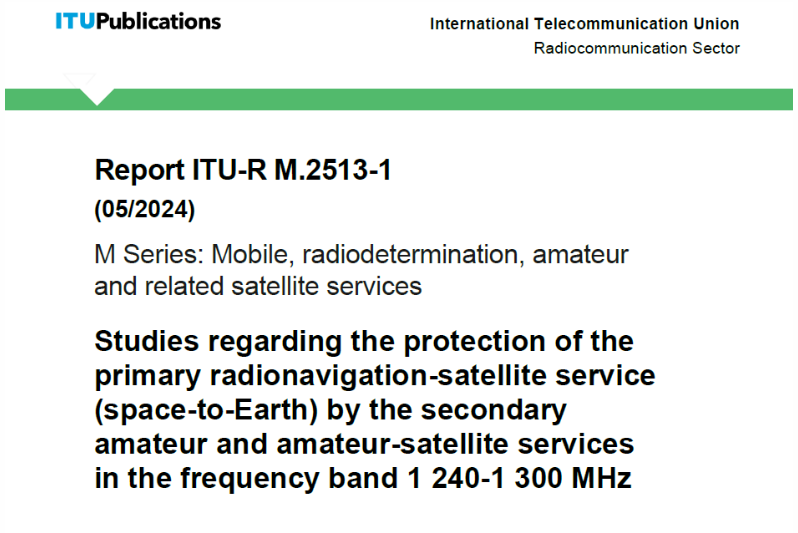
ITU-R Study Period Results (WRC19 to WRC23)

- Deliverables from the ITU-R Study Group 5 activities:
- **ITU-R Report M.2513-1** contains the technical studies.
- **ITU-R Report M.2532-0** details the 23cm amateur band usage.



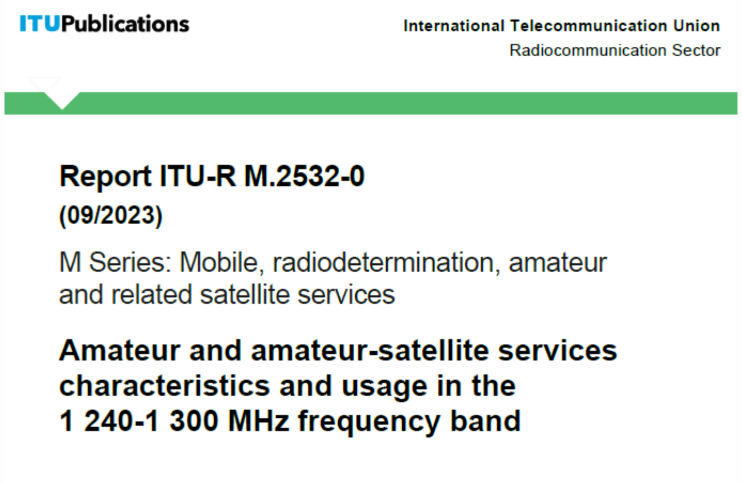
ITUPublications

International Telecommunication Union
Radiocommunication Sector

Report ITU-R M.2513-1
(05/2024)

M Series: Mobile, radiodetermination, amateur and related satellite services

Studies regarding the protection of the primary radionavigation-satellite service (space-to-Earth) by the secondary amateur and amateur-satellite services in the frequency band 1 240-1 300 MHz



ITUPublications

International Telecommunication Union
Radiocommunication Sector

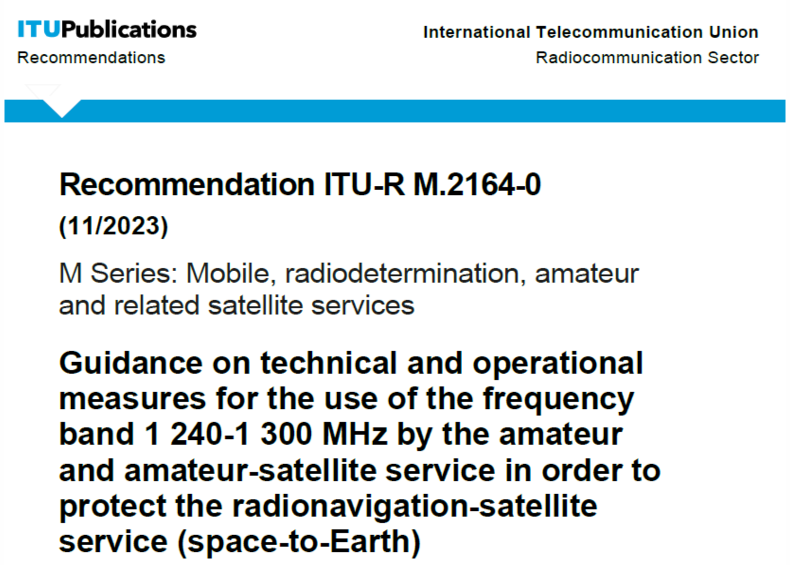
Report ITU-R M.2532-0
(09/2023)

M Series: Mobile, radiodetermination, amateur and related satellite services

Amateur and amateur-satellite services characteristics and usage in the 1 240-1 300 MHz frequency band

Outcome from WRC-23

- ITU-R Radio Assembly RA-23 met one week before WRC-23.
- **ITU-R Recommendation M.2164-0** was agreed and published.
  - The technical measures are detailed in the Annex.



ITUPublications
Recommendations

International Telecommunication Union
Radiocommunication Sector

Recommendation ITU-R M.2164-0
(11/2023)

M Series: Mobile, radiodetermination, amateur and related satellite services

Guidance on technical and operational measures for the use of the frequency band 1 240-1 300 MHz by the amateur and amateur-satellite service in order to protect the radionavigation-satellite service (space-to-Earth)

recommends

that administrations wishing to allow operations or continue the operation of the amateur and amateur-satellite services across their territory in all or part of the frequency band 1 240-1 300 MHz, **should use as guidance** the technical and operational measures described in the Annex in order to protect RNSS (space-to-Earth).

WRC-23 on Agenda Item 9.1 b)

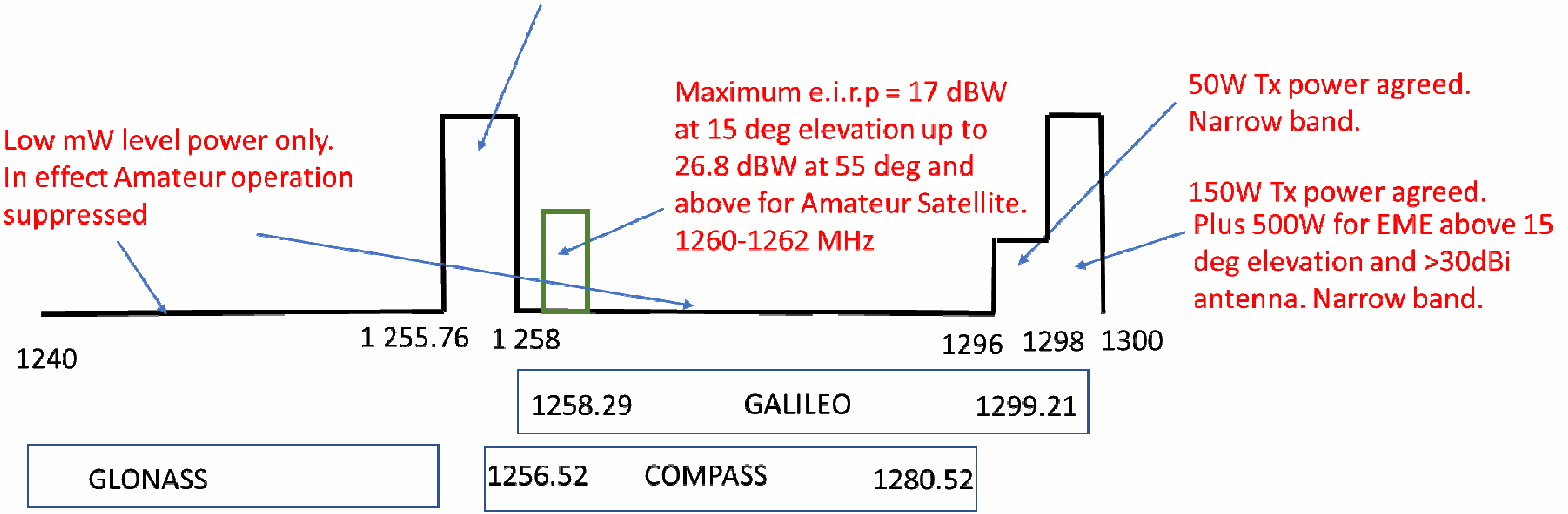
- In the **ITU-R Radio Regulations Article 5** a new footnote was agreed for the band 1 240-1 300 MHz:

"5.A91B Administrations authorizing operation of the amateur and amateur-satellite services in the frequency band 1 240-1 300 MHz, or portions thereof, shall ensure that the amateur and amateur-satellite services do not cause harmful interference to radionavigation-satellite service (space-to-Earth) receivers in accordance with No. 5.29 (**see the most recent version of Recommendation ITU R M.2164**). The authorizing administration, upon receipt of a report of harmful interference caused by a station of the amateur or amateur-satellite services, shall take all necessary steps to rapidly eliminate such interference. (WRC 23)"

- Entering into force January 2025.

M.2164 measures summarised

For Broadband:
1 255.76-1 256.52 MHz: e.i.r.p. = 24 dBW/150kHz (Assuming 18dBi antenna = 50W/2MHz)
1 256.52-1 258 MHz: e.i.r.p. = 21 dBW/150 kHz (Assuming 18dBi antenna = 25W/2MHz)



Low mW level power only.
In effect Amateur operation suppressed

Maximum e.i.r.p = 17 dBW at 15 deg elevation up to 26.8 dBW at 55 deg and above for Amateur Satellite.
1260-1262 MHz

50W Tx power agreed.
Narrow band.

150W Tx power agreed.
Plus 500W for EME above 15 deg elevation and >30dBi antenna. Narrow band.

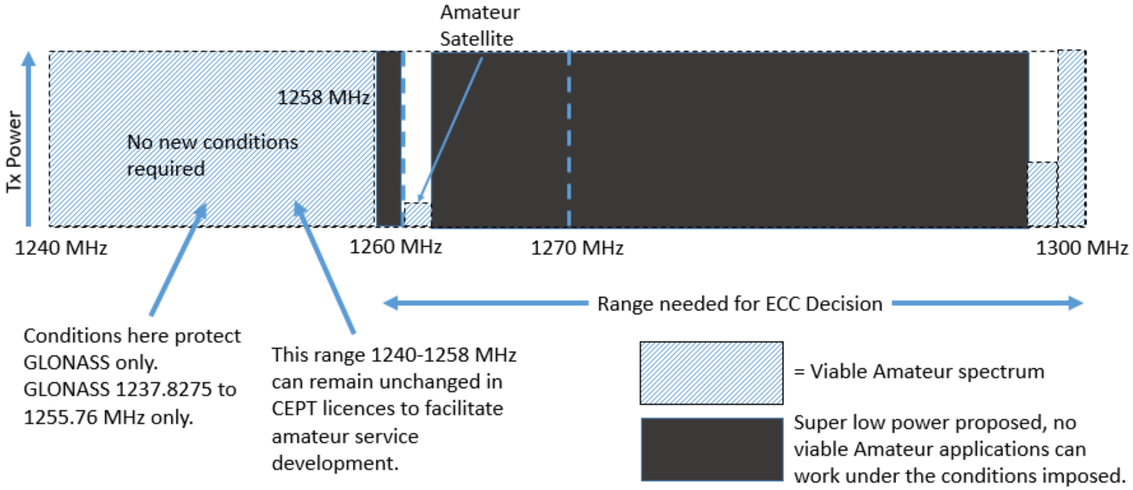
Region 1 and CEPT and Europe

- European CEPT/ECC countries will continue to develop ECC Decisions to harmonise and **protect the EU Galileo spectrum** (1 258 – 1 299MHz).
- ECC Report 359 has undergone public consultation and will be submitted for publication.
  - CEPT/ECC WG-FM will continue to develop spectrum decisions related to this work.
- The implementation of M.2164 by CEPT countries is difficult to predict at present.
- Some countries (e.g. Belgium) already reacted to the WRC outcome.

Europe’s interest is focussed on Galileo

- Galileo E6 band is in the range 1258.29 – 1299.21 MHz, so only this part of the band needs protecting.
- Information Paper: “**Developing the amateur services in the 23cm band when considering ITU-R Recommendation M.2164**” has been circulated.

This approach will be encouraged.



Conditions here protect GLONASS only. GLONASS 1237.8275 to 1255.76 MHz only.

This range 1240-1258 MHz can remain unchanged in CEPT licences to facilitate amateur service development.

▨ = Viable Amateur spectrum

■ Super low power proposed, no viable Amateur applications can work under the conditions imposed.

Impact on 23cm band EME operations

- Some radio amateurs may be forced to change the favoured operating frequencies if the technical measures are reflected into national licences.
  - Higher transmitter power possible in 1298 – 1300 MHz.
  - Power reduced in the 1296 – 1298 MHz part of the band.
  - 15 degree elevation constraint and antenna requirement for higher power.
- The technical measures might not be applied universally.
  - Should everyone move frequency?
  - Could split frequency operation be feasible?

Final Words

- The IARU work and a positive outcome for this topic in WRC23 depended entirely on an international team lending their time and expertise to engage in the discussions from the lowest level drafting groups up to the highest level at the ITU-R.
- The global lead Barry Lewis G4SJH particularly extends thanks to:
    - Dale Hughes VK1DSH – chaired the Study Group activities.
    - Jon Siverling WB3ERA – chaired the ITU-R RA group.
    - But not forgetting the entire multi-regional WRC-23 AI9.1 b) team.

ITU-R AI9.1 b) Drafting Group